

# LANL Materials Representation and 3013 Shipment Plans

---

Simon Balkey, NMT-2, Point of Contact,  
LANL Materials Stabilization Project

Paul Smith, NMT-2, Project Leader,  
LANL Materials Stabilization Project

3013 Monitoring and Surveillance Quarterly Meeting  
February 25, 2003  
Savannah River Site

LA-UR-03-1268

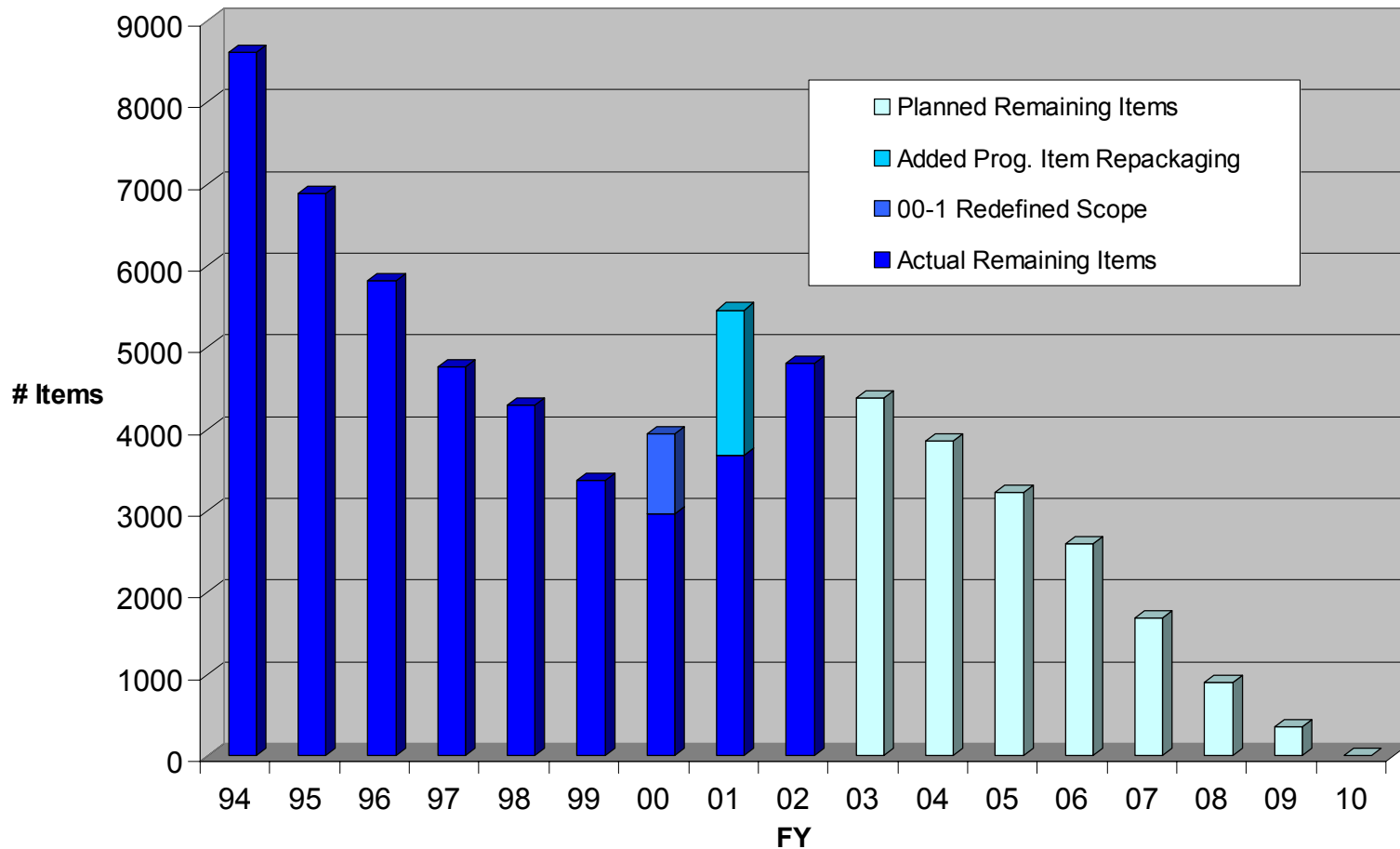


# Outline

---

- Excess Item Progress
- Inventory
- Schedule
- LANL Representation
- Processing/Quality Control
- Feedback

# Overall Progress

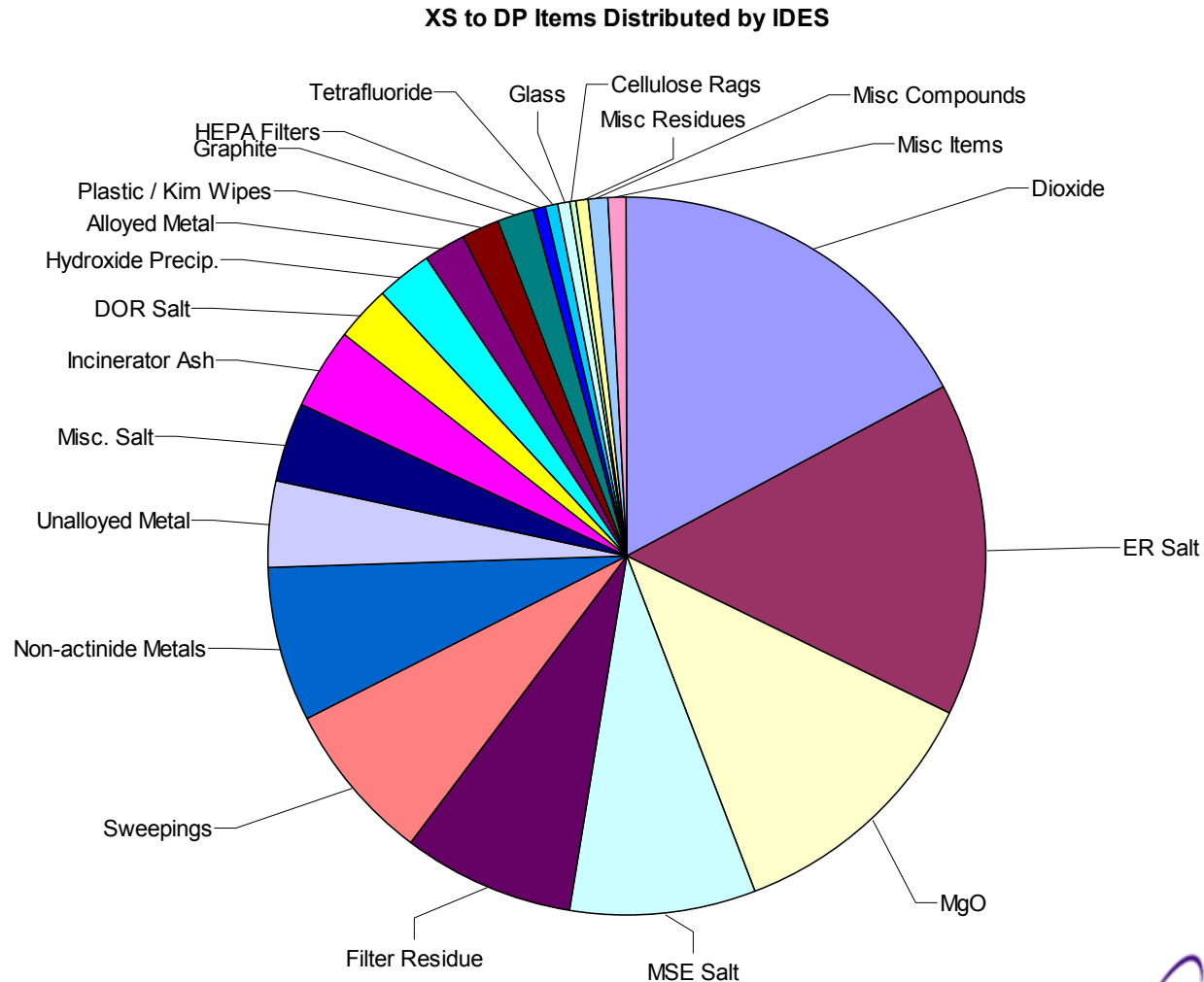


# 3013 Shipping Schedule

---

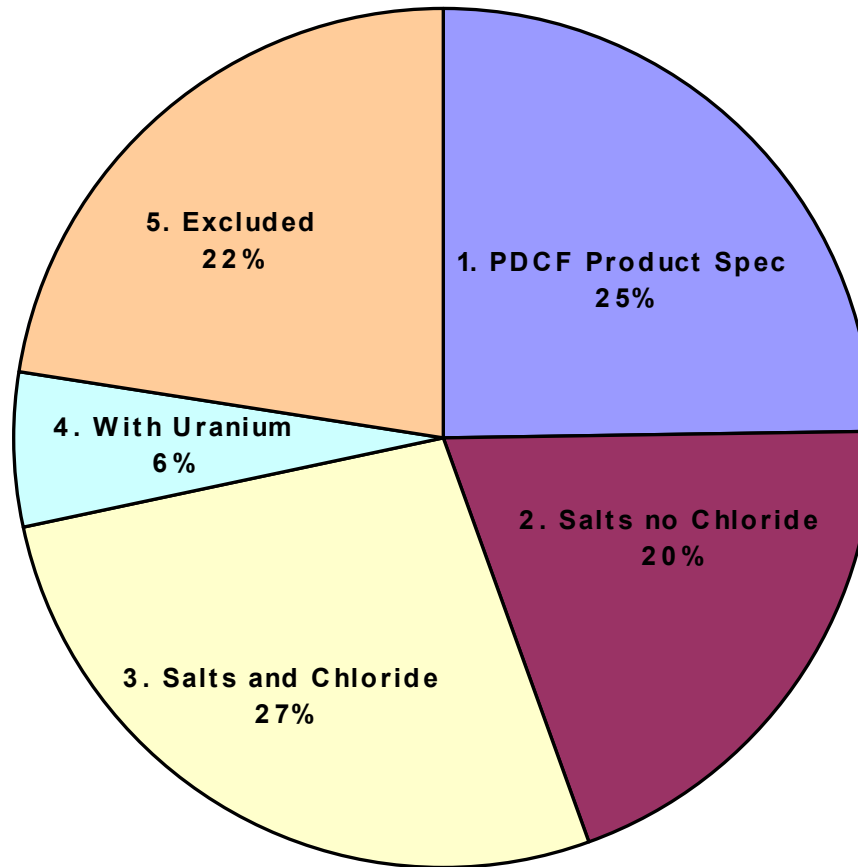
Year	FY04	FY05	FY06	FY07	FY08	FY09	FY10	Total
NA-262 (PDC Materials)	75	50	25					150
Alt MOX Feed:		30	30	60	60	60	50	290
Not MOX Suitable: FG Pu			10	10	10	20	20	70
Not MOX Suitable: Am, Be, Np, Th			5	5	5	10	10	30

# Excess Items Distribution by Type



# LANL Feed as AFS Categories

---





# Defining Representation Path

---

- **Process History for Representation**
  - The use of process knowledge will precede all other methods for representation of LANL materials. Many processing streams at LANL are well characterized and should provide ample information for those items that are generated from a well characterized stream to be compared to represented processes in the MIS program. It is assumed that all items identified using this method can not exactly match impurity levels of those in the MIS program. MISWG will review all representation determinations made by this method, in particular, those determinations made relating LANL items to another sites represented process stream.
- **Prompt Gamma for Representation**
  - All material going into 3013 containers will receive a prompt gamma measurement. This measurement will be used to aid in representation whenever process history is unavailable or when process history is deemed insufficient by MISWG review to solely represent an item(s). On occasion, prompt gamma measurement for an item may not be conducted due to special circumstances.
- **Analytical Chemistry**
  - At times that representation is too difficult to determine through process knowledge and/or prompt gamma, an analytical sample (or sample results) to the MISWG for review. Comparison to existing items in the MIS program will be identified or a new item will be entered into the program through this method.



# Process Acceptable Knowledge

---

Document	Title	LA-UR	Date	Process Streams
TWCP-AK-2.1-002,R.2/IC1	Process Acceptable Knowledge Report for <b>Chloride</b> Operations at TA-55	(LA-UR-02-1710)	3/21/02	
TWCP-AK-2.1-003,R.2/IC1	Process Acceptable Knowledge Report for <b>Metal</b> Operation Processes at TA-55	(LA-UR-02-1716)	3/21/02	
TWCP-AK-2.1-004,R.2/IC2	Process Acceptable Knowledge Report for <b>Miscellaneous</b> Operations at TA-55	(LA-UR-02-1714)	3/21/02	
TWCP-AK-2.1-005,R.2/IC1	Process Acceptable Knowledge Report for <b>Nitrate</b> Operations at TA-55	(LA-UR-02-1715)	3/21/02	
TWCP-AK-2.1-006,R.2/IC1	Process Acceptable Knowledge Report for <b>Pyrochemical</b> Processes at TA-55	(LA-UR-02-1713))	3/21/02	
TWCP-AK-2.1-007,R.2/IC1	Process Acceptable Knowledge Report for <b>Special Processing</b> at TA-55	(LA-UR-02-1712)	3/21/02	
TWCP-AK-2.1-009,R.0/IC1	Process Acceptable Knowledge Report for <b>Plutonium-238 Operations</b> at TA-55	(LA-UR-02-1709)	3/21/02	
TWCP-AK-2.1-013,R.0	Acceptable Knowledge Report for <b>Newly Generated Waste from Nitrate Operations</b> at TA-55	(LA-UR-02-6779)	10/16/02	
TWCP-AK-2.1-014,R.0	Acceptable knowledge Report for <b>Newly Generated Waste from Miscellaneous Operations</b> at TA-55	(LA-UR-02-6904)	11/18/02	
TWCP-AK-2.1-015,R.2	Acceptable Knowledge Report for <b>Legacy Debris TA-55 Waste Streams Containing Pu-239</b>	(LA-UR-02-6665)	10/9/02	
TWCP-AK-2.1-016,R.0	Acceptable Knowledge Report for <b>Newly Generated Waste From Special Processing</b> Operations at TA-55	(LA-UR-02-6905)	10/18/02	
TWCP-AK-2.1-017,R.0	Acceptable Knowledge Report for <b>Newly Generated Waste From Metal/Pyrochemical</b> Operations at TA-55	(LA-UR-02-6906)	10/22/02	
TWCP-AK-2.1-018,R.1	Acceptable Knowledge Report for <b>Newly Generated TA-55 Debris Waste Streams Containing Pu-239</b>	(LA-UR-02-6903)	11/18/02	

# Process Knowledge from Chloride AK Document

TWCP-AK-2.1-002.R.2/IC1 (LA-UR-02-1710)  
Effective Date: 03/21/02

Page 14 of 19

Table 3. Chemical Inputs to Processes Described in This Report

Chemical Input	P/S Codes in Which RCRA-Listed Chemicals Are Used	Comments on Applicability of RCRA HWNs (if any)
<b>Gases</b>		
Argon gas		
<b>Acids</b>		
Hydrochloric acid Hydrofluoric acid Nitric acid Oxalic acid		D002 does not apply to the solid debris waste because there are no free liquids in this waste. D001 (oxidizer) does not apply to the use of nitric acid for the same reason.
<b>Bases</b>		
Calcium hydroxide Magnesium hydroxide Potassium hydroxide Sodium hydroxide		D002 does not apply to the solid debris waste because there are no free liquids in this waste.
<b>Inorganic Chemicals</b>		
Aluminum chloride Calcium carbonate Calcium fluoride Cesium chloride Dicesium hexachloropluatonate (DCHP) Ferrous chloride Hydroxylamine hydrochloride Potassium dichromate	CS, CSE, PB, PUB, SE	D007 applies to P/S codes CW and CX until end of 1993. Used in P/S codes CS, CSE, PB, PUB and SE as a titration endpoint indicator. The chromium-bearing solution is sent to P/S code CW or CX (Hydroxide precipitation), and chromium is incorporated as a contaminant in the hydroxide cake (TWCP-4166, TWCP-4167)
Potassium fluoride Silver nitrate	CS, CSE, PB, PUB, SE	D011 applies to P/S codes CW and CX until end of 1993. Used for chloride titration in P/S codes CS, CSE, PB, PUB and SE (CI-23/TWCP-3547). The silver-bearing solution is sent to P/S code CW or CX (Hydroxide precipitation), and silver is incorporated as a contaminant in the hydroxide cake.
Sodium bicarbonate Sodium nitrite Stannous chloride		
<b>Organic Chemicals</b>		
Bromocresol purple Octylphenyldisobutylcarbamoyl methylphosphine oxide (CMPO) Tetrachloroethylene Tributyl phosphate (TBP)	CSE, SE	D039, F002 (used as solvent). Used until 1992 in P/S codes CSE and SE

# Moisture Measurement

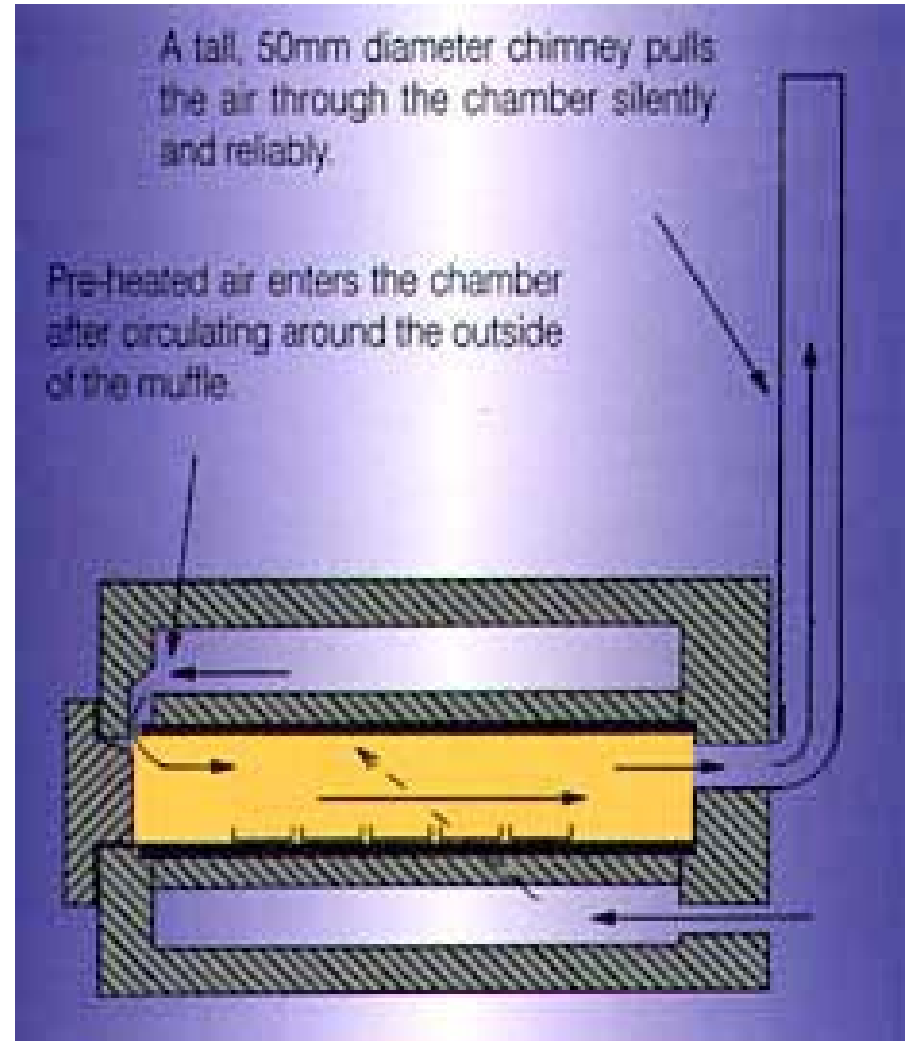
---

- Moisture samples will always be representative of the parent material
- An LOI measurement will always be performed
- Other samples will be taken as necessary so other moisture analysis techniques, such as TGA, SFE, Neutron Mod, etc. can be performed
- LANL plans on ensuring moisture criteria is met by several methods of moisture analysis if necessary

# **Dry Processing Areas of Concern**

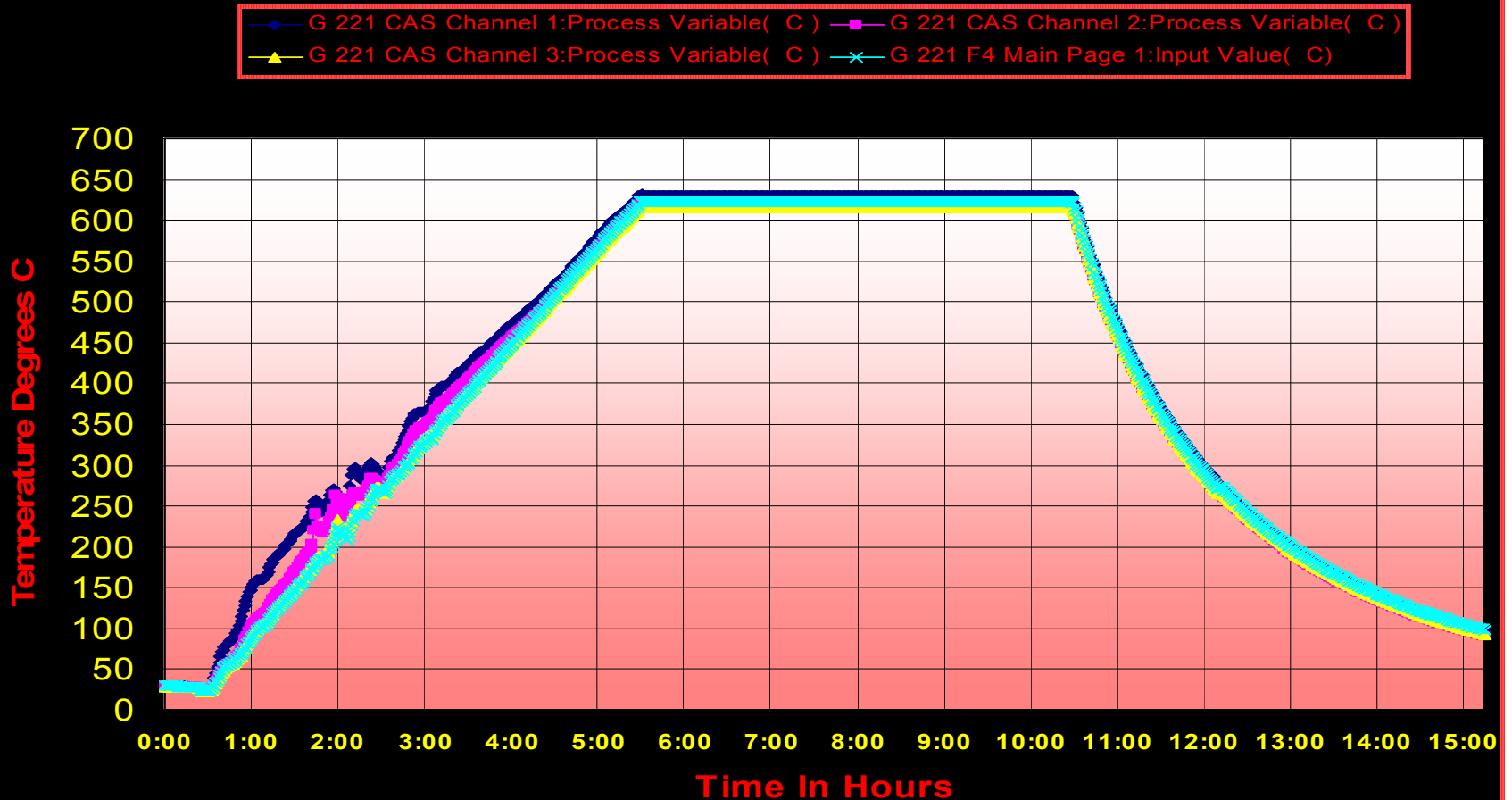
- Representative Sampling
- Thermal Profiling
- Stabilization Temperatures
- Blending
- Readsorption of moisture
- Oxidizing Atmosphere
- QC Documentation

# Carbolite 1100°C Furnace



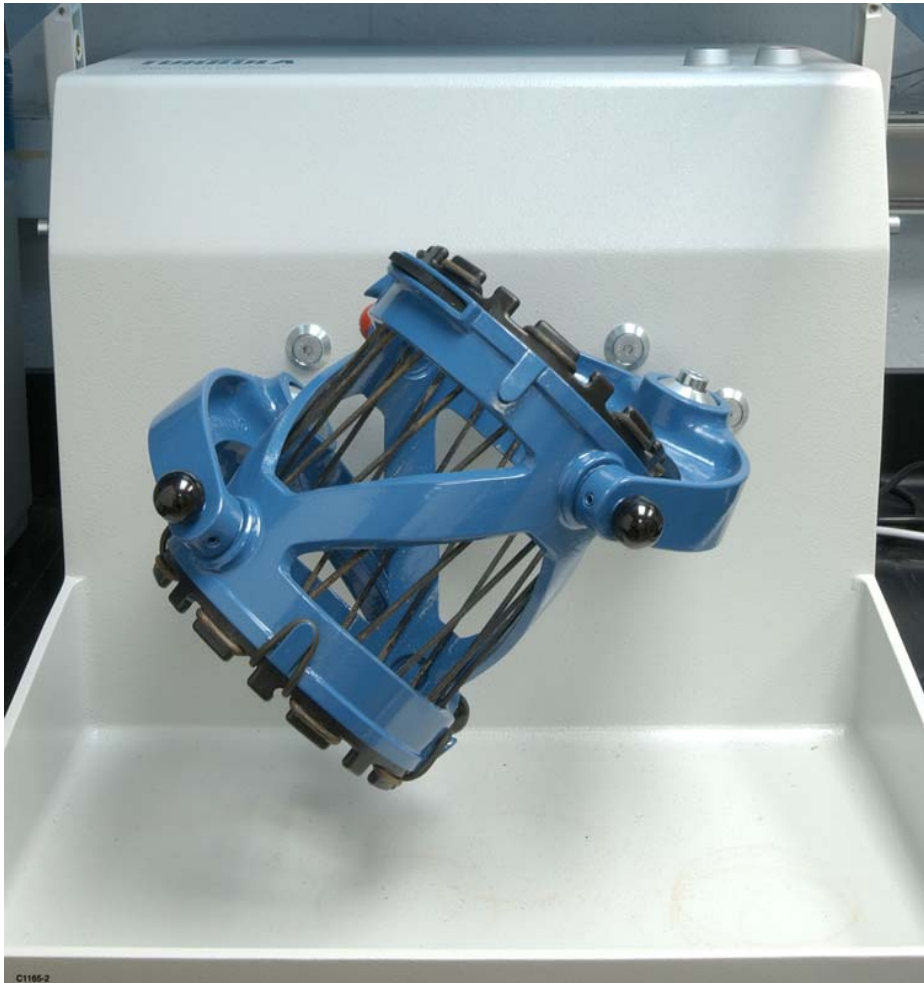
# Temperature Profile

## Acceptance Test



# Turbula (T2F) Blender

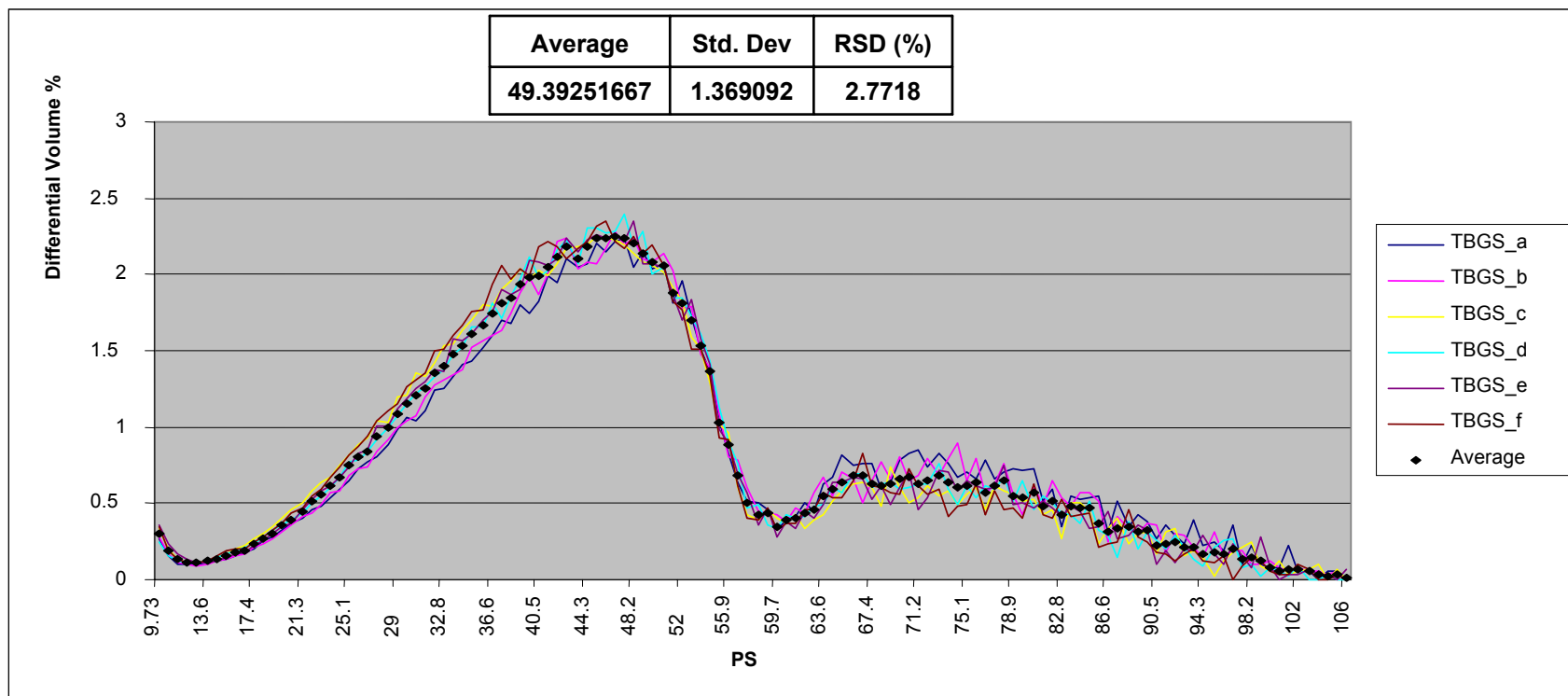
---



- 2000cm<sup>3</sup> Capacity
- 3 Dimensional Mixing

# T2F Acceptance Test Data

500g Soda Lime Glass Beads Blended 5 Minutes (5-106 $\mu$ m)





# Glove Box

---

- No plumbed aqueous lines
  - Allows for high criticality limits
- Dry air supplied
  - Dryers cool -70 to -40°F Dew Point less than <200ppm<sub>v</sub> moisture
  - Aids in reducing readsorption of moisture by oxide/oxide like materials

# Quality Control

- An official LANL document will be drafted that includes quality control hold points that are consistent with 3013 criteria

# Questions to Ask

---

- Are all sites working to the AFS?
- How must the sites validate their material as meeting AFS with only process knowledge?
- What kind of documentation needs to be provided to show that we do have process knowledge?
- Does AFS apply to individual items or to the overall material?